



From Triage

To Transition

heet 2019 Annual Report



HEET CUTS CARBON EMISSIONS NOW BY DRIVING SYSTEMS CHANGE

HEET is a nimble nonprofit seeking solutions to climate change through research, education, and collective action. We convene stakeholders to co-design innovative solutions and drive systemic impact.

LETTER FROM HEET'S EXECUTIVE DIRECTORS

The Merrimack Valley Gas Disaster was two years ago this fall. We will never forget the smoke from dozens of fires rising up over the valley or the reality of 50,000 people fleeing, some unable to return home for months.

Afterwards, more people understood the immediate dangers of gas. For years at HEET we have also worried about the threat to our children's future from using gas. Why?

Gas, if leaked out before it is burned, is methane, an extraordinarily potent greenhouse gas. Because of that potency, the small amount of unburned gas leaked throughout the Commonwealth is roughly equivalent to the emissions of all of our stores and businesses.

This outsized climate impact is why HEET has worked so hard to move us "Beyond Gas." Reducing gas use can cut emissions faster than almost any other tactic. So we created the GeoMicroDistrict to transition us off gas.

The GeoMicroDistrict is a novel networked geothermal approach. GeoMicroDistricts interconnect like Lego® blocks to grow into larger districts, incrementally replacing the current gas system. This new thermal system is safer than gas and likely to result in lower energy bills. It will cut our buildings' emissions by 60 percent now,¹ and as our electric grid moves to renewables, emissions approach zero.

So we are thrilled to announce that the largest gas utilities in our state are all moving forward to pilot the GeoMicroDistrict—a transition off gas! We are even more thrilled that one of these pilots will be in the Merrimack Valley. To us, the possibility that this community will lead us to a safer future just feels right.

What our tiny team at HEET has accomplished this year is incredible.

Thank you.

Your energy and enthusiasm, your time, your kind words, and your generous donations have made all these accomplishments possible.

You have given us the gift of looking forward to next year. That feels pretty precious these days. We hope what we share in this report leaves you excited about next year too.

With sincere thanks,

Audrey Schulman and Zeyneb Magavi

Executive Directors, HEET



¹ Buro Happold Engineering, Geo Micro District Feasibility Study, <https://heetma.org/wp-content/uploads/2019/11/HEET-BH-GeoMicroDistrict-Final-Report-v2.pdf>, p. 46.

2019 HIGHLIGHTS

Gas is overwhelmingly methane, a greenhouse gas 86 times more potent than carbon dioxide in a 20 year timeframe. Gas leaks can explode, suffocate trees, and increase our gas bills.

In 2019 we continued to reduce emissions by triaging—or finding and fixing—the worst leaks, while we accelerated the transition to a renewable system and began to transform the gas narrative.

Triage

Massachusetts ranks in the top five states with the oldest and most leak-prone natural gas systems. Our triage program identifies the seven percent of leaks that emit half of all methane. Rapid repair of “super-emitting” leaks will reduce the state greenhouse gas inventory by four percent and offer a national model to cut emissions quickly at the least cost.

Significant Environmental Impact (SEI) Leaks

After the three largest gas companies in the state publicly

“From publishing maps of gas leaks across the state, to pioneering a method to cut leaking methane in half in just a few years, HEET continues to impress us all with their expertise, concern for accuracy, and generosity in sharing their knowledge with all. We need more nonprofits like HEET!” Senator Cynthia Creem (D-majority leader)

committed to the 2017 Shared Action Plan, HEET began serving as a watchdog to verify utilities’ identification and repair of super-emitting leaks (SEI leaks) to ensure real emissions reductions.

- The utilities share their SEI data with us.
- We check they are identifying the right ones, repairing them successfully, and search for any they might have missed.
- We shared the results in our first Significant Environmental Impact (SEI) Leaks field trial report.
- Pending publication, an MIT lab used our SEI data to analyze leak repair success.

Lost and Unaccounted for Gas Legislation

Lost And Unaccounted For (LAUF) gas is gas the utilities cannot account for, whether leaked or not. Before 2018, there was little consistency or transparency in utility reported LAUF. HEET worked hard to unpack, understand,

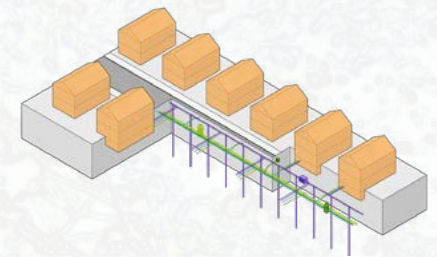
and educate legislators and advocates on the need for transparency and standardization. State legislation to achieve this passed in 2018.

- With uniform and transparent accounting, stakeholders have a better idea where the emissions are coming from and how to fix the problem.
- The Department of Public Utilities invited HEET to a working group to advise on the regulation.
- HEET created a calculator that used utility data to estimate emissions. The utilities are required to use it for a trial year.
- The Dept. of Environmental Protection is considering use of the HEET calculator as it updates how the utilities report state emissions.
- Gas leaks were previously lumped in with accounting error and thought to be a tiny fraction of the total. Using the HEET calculator, utilities gas leak emissions are higher.

Transition

The need to move beyond gas drove us to develop a solution that transitions not just the technology, but gas utilities, their workers, and customer

households, while providing a clean, safe, just, and affordable move to reliable heating and cooling. We call our networked geothermal solution the “GeoMicroDistrict”.



GeoMicroDistricts are networked boreholes in the gas right-of-way, connected by a shared loop of ambient temperature water that supplies thermal energy to heat pumps in buildings.

GeoMicroDistricts Might be the Answer

We asked Buro Happold Engineering to evaluate the feasibility of GeoMicroDistricts, for replacing the Massachusetts gas system.

- Results projected a lower customer cost than natural gas and a 90 percent emissions reduction by 2050.
- 100 percent of heating and cooling loads could be delivered in a majority of street segments.

Okay, Let's Start Digging

We're eager to get a GeoMicro-

District in the ground, and the good news is, so are our partners.

Our vision is to transition not just the infrastructure, but the gas companies themselves into renewable thermal companies, using their skills, financing, customers, and workers. The GeoMicroDistrict reduces the cost of energy and mitigates the health impacts of combustion. Instead of replacing 25 percent of our existing infrastructure, we can use those funds to move to a clean energy future at the speed and scale we need. The thermal grid formed when GeoMicroDistricts interconnect is expected to provide energy storage and lower electric costs.

- Eversource Gas has requested permission from the DPU to install three GeoMicroDistrict pilots
- Columbia Gas territory will get a GeoMicroDistrict pilot as a condition of sale.

"Like many environmental advocacy organizations, HEET cares about people and the planet. What sets them apart is that they do the hard work necessary to ensure ALL of our lives will be better, beginning with those whose lives are already impacted by environmental injustice. I love that HEET makes room to find that common ground, from government, to corporate, to people on the ground, allowing us to move forward together toward a more equitable future. Their commitment to finding and realizing solutions gives me the hope that we can indeed create another world that's sustainable and equitable." Kannan Thiruvengadam, Executive Director, Eastie Farm

- National Grid has requested permission to pilot in upstate New York and is proposing a pilot in Massachusetts as well.
- Consolidated Edison has filed their intention to pilot two networked geothermal systems in New York.
- Xcel Energy, with operations in eight states, requested a second GeoMicroDistrict talk from HEET and is sharing our presentation internally.
- Our approach to engaging utilities has been so successful that the Harvard Program on Negotiation selected us as a case study, taught by Dan Shapiro, author of Beyond Reason.

As powerful forces adopt the GeoMicroDistrict, we feel an increasing need for community outreach, engagement, and industry oversight in order to ensure the public good.

GeoMicroDistricts can be a safer, better business model for gas companies while providing

"HEET is the ideal partner! They are as rigorous in the pursuit of knowledge as any academic group is, and then they apply the research results to enact practical actions to make our homes and planet healthier." Jonathan Buonocore, Sc.D. Center for Climate, Health, and the Global Environment, Harvard T.H. Chan School of Public Health

equitable access to renewable heat for customers and drive electrification at the speed and scale we need.

Transformation

Gas is sold as a "clean" and "natural" product, especially for cooking, but science does not support this claim. Preliminary research indicates that fracked gas contains chemical components harmful to human health. Furthermore, testing shows that most gas appliances and buildings have micro gas leaks. Uncovering exactly what contaminants are likely to be present in unburned natural gas collected from households

could help mitigate associated health issues such as asthma, and could powerfully transform the narrative.

What exactly is in gas?

Spurred by questions without answers, HEET and our allies pioneered the sampling and testing of the natural gas system for its chemical composition. HEET is now partnered with Harvard School of Public Health to study the regional gas supply.

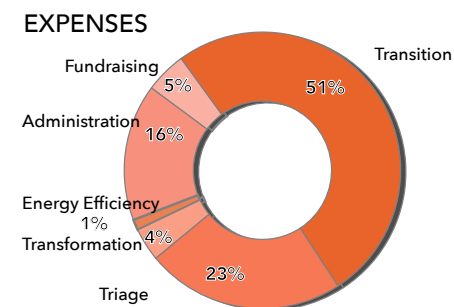
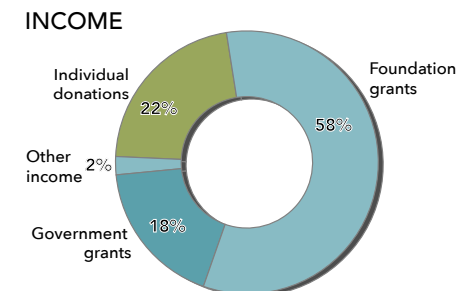
- In the first phase, we identified over 100 compounds in the gas supply.
- Phase two is more than halfway complete and will result in a peer review publication.

Triaging the safety and climate impact of the current system, designing a transition off gas that all stakeholders approve, and transforming the narrative to attain market acceptance, is our three-pronged approach to Beyond Gas.

THANKS TO YOUR CONFIDENCE IN AND FUNDING OF HEET PROJECTS, WE WERE ABLE TO GROW DRAMATICALLY LAST YEAR.

Statement of Financial Position	2019
Assets	
Cash	\$179,649
Grants receivable	\$48,174
Total	\$227,823
Liabilities and net assets	
Current Liabilities	\$13,660
Unrestricted net assets	\$58,946
Temporarily restricted net assets	\$155,217
Total	\$227,823

Statement of Activities	2019
Revenue	
Individual donations	\$110,778
Foundation grants	\$294,039
Government grants	\$92,020
Other income	\$2,184
Total	\$499,022
Expense	
Program	\$272,259
Administration	\$54,903
Fundraising	\$16,452
Total	\$343,614
Net Income	\$155,408



DONATIONS TO HEET GO FAR.

HEET does not accept money from utilities or geothermal companies. In order to maintain our independence, we choose instead to be funded by private donors, foundations, and state and federal government. HEET continued to approach all three in 2019 to support our many current and proposed projects.

With the increase in funding in 2019, we've been able to expand our team. As a nimble action-oriented nonprofit, we direct every dollar to programs. Our results come about through building coalitions to develop solutions and take action.

**JOIN US IN DRIVING FORWARD
A JUST TRANSITION TO A
STABLE CLIMATE.**

HEET greatly appreciates the financial support provided in 2019

Sharon Abramowitz
Rachel and Steve Adler-Golden
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Zeyneb Magavi, Research Director
Katherine Fisher, Operations Manager
Dominic Nicholas, Research Director
Molly Fairchild, Research Director



*Transforming the future to a modern,
equitable society in balance with the
environment.*

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Gas leaks can suffocate tree roots, eventually killing the tree.
Healthy trees are a sign of a healthy community.

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